

REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Official Action dated 29 August 2005. Responsive to the rejections made in the Official Action, Claims 1 and 2 have been amended to clarify the combination of elements which form the invention of the subject Patent Application and Claims 3 and 10 were amended to correct informalities therein.

In the Official Action, the Examiner rejected Claim 2 under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential elements. More specifically, the Examiner stated that the preamble of the Claim called for four keys for watermark extraction; however, the Examiner stated that the Claim recited only two keys as limitations therein.

Claim 2 has been amended to correct the language thereof. The recitation in the Claim referred to four keys, which were in fact four key features of the extraction method and not encryption keys. Accordingly, such has now been clarified in the Claim and corresponds to the Specification, page 9, lines 5-11.

In the Official Action, the Examiner rejected Claims 1, 3 and 6-10 under 35 U.S.C. § 102(e), as being anticipated by Manjunath, U.S. Patent 6,332,030. However, the Examiner kindly indicated that Claims 2, 4 and 5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Accordingly, Claim 2 has been amended to incorporate the subject matter of Claim 1 therein, thereby effectively rewriting Claim 2 in independent form to include all of the limitations of the base claim, Claim 1, and any intervening claims, which there were none. Thus, Claim 2 and the claims dependent thereon (4 and 5) should now be allowable.

Before discussing the prior art with respect to Claims 1, 3 and 6-10, it is believed beneficial to first briefly review the method of the invention of the subject Patent Application, as now claimed. The invention of the subject Patent Application is directed to a watermark embedding process using a sub-band filtering. In the method, original data for an entire image is split into $N \times N$ blocks and then is transformed into a frequency domain with N being an integer greater than 1, and an HH band with $N/2 \times N/2$ coefficients is tested on a high frequency feature. Then, a full watermark image data is transformed into the frequency domain. LL band coefficients of the watermark image data are then quantized and inserted into a block of the HH band having the tested high frequency feature. Further, a composite data of the original data and the watermark data is produced by an inverse transformation of each block of the original data.

In contradistinction, the Manjunath, et al. reference is directed to a method for embedding and extracting digital data in images and video which avoids the use of HH band for embedding coefficients of the watermark. In fact, the reference utilizes the LL band exclusively. The referenced method finds

watermarking image coefficients with 24 bits in the LL band that are split into three parts, each being 8 bits in length. The host image uses 2*2 coefficient blocks in the LL band, and the three parts of the watermarking image coefficients are embedded in the host image using 2*2 coefficient blocks. Whereas in the invention of the subject Patent Application, the watermarking coefficients are quantized and inserted into blocks of the HH band (high frequency region of the original image), the blocks into which the coefficients are inserted being determined by searching for maximum variation blocks (high frequency feature) over the whole image.

The referenced method avoids the use of HH band data totally, thereby teaching away from the method of the invention of the subject Patent Application, wherein the LL band coefficients are embedded in blocks of the HH band. Further, in the referenced method the embedding position is fixed in the 2*2 coefficient block in the LL band, whereas in the invention of the subject Patent Application the embedding position is dependent upon the image which is adaptively searched to find the maximum high frequency variation block.

As the reference fails to disclose each and every one of the limitations of the invention of the subject Patent Application, it cannot anticipate that invention. Further, as the reference fails to suggest such a combination of method steps and in fact teaches away from the combination of method steps of the invention of the subject Patent Application, it cannot make obvious that invention either.

It is respectfully submitted that Claim 3 provides further patentably distinct limitations. The referenced system uses signature coefficients for mapping a particular codebook, whereas the codebook of the invention of the subject Patent Application is created with the host image, the original data and the watermark data all are transformed to the frequency domain with full pictures and the coefficient matrix of the original data are contents of the codebook, as claimed. Further, the referenced method the signature coefficients are directly mapped to the codebook, whereas in the invention of the subject Patent Application each watermark coefficient being mapped to the codebook and inserted to the codebook; a best match being found and a coordinate thereof being recorded as the system key, as claimed. Still further, in the referenced system the private key is fixed to select the various hosts DWT coefficient for watermarking coefficient embedding. Whereas in the invention of the subject Patent Application, the private key is found with the best mapping coordinate in the codebook.

Therefore, it is believed that the reference fails to disclose each and every one of the additional limitations in Claim 3, and cannot anticipate that Claim, as well. While it is believed that the other dependent Claims not specifically discussed add further patentably distinct limitations, they are at least patentably distinct for the same reason as Claim 1.

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For all of the foregoing reasons, it is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
For: ROSENBERG, KLEIN & LEE

A handwritten signature in cursive script, reading "David I. Klein".

David I. Klein
Registration No. 33,253

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Suite 101
3458 Ellicott Center Drive
Ellicott City, MD 21043
(410) 465-6678
Customer No. 04586